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# News Release

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## **Cold Regions Lab Researcher Receives Hammer Award**

**HANOVER, N.H.**—Charles J. Korhonen, a research civil engineer, with the U.S. Army Engineer Research and Development Center's Cold Regions Research and Engineering Laboratory (CRREL) in Hanover, N.H., has received the Hammer Award for his role as the Team Leader of the Low-Temperature Repair Team for Sequoyah Nuclear Power Plant.

Vice President Al Gore created the Hammer Award to recognize Government teams who show innovation either by (1) putting customers first, (2) empowering employees, (3) cutting red tape, or (4) achieving results American citizens care about. The Hammer is symbolic of "hammering away at building a better government" – one that works better and costs less.

The Tennessee Valley Authority (TVA) was faced with a dilemma at their Sequoyah Nuclear Power Plant located near Chattanooga, Tenn. The concrete floors in its ice-storage rooms had heaved upward because of frost action and needed to be repaired. The dilemma was that the work had to be done under tight time constraints of a nuclear refueling outage and at  $-8^{\circ}\text{C}$ , the operating temperature of the ice-storage rooms, but that was not possible, as ordinary concrete cannot cure under those conditions. Shutdown of the ice-storage rooms in the nuclear plant was not acceptable, since each day of shutting down the plant represented a potential of \$1 million in lost revenue and loss of service to their customers.

CRREL's Korhonen, in a joint effort with the Tennessee Valley Authority (TVA), S&ME Singleton Labs, and a private material and concrete construction consultant, developed a lightweight portland cement concrete mixture that allowed repairs without shutting down the nuclear plant or disrupting service. This new concrete mix was placed, consolidated, finished and

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cured at below-freezing temperatures without thermal protection. Ordinary concrete would not have survived.

Korhonen states, "This technology, for placing concrete at sub-freezing temperatures, could extend the concrete construction season by several months in much of North America. Currently, the U.S. construction industry spends about \$1 billion dollars per year to provide heated enclosures for placing concrete at below-freezing outdoor temperatures. Approximately \$800 million of that cost is in heat from non-renewable fossil fuels much of which could be saved by adopting this new low-temperature concrete technology."

A Purdue University doctoral candidate, Korhonen has been a member of CRREL's technical staff since 1975. He holds two patents and has authored more than 60 technical reports and journal articles pertaining to moisture problems in roofing systems, cold regions building coatings, and improved cold weather concrete and masonry construction practices.

Korhonen resides in Etna, N.H.

For more information regarding this concrete technology, please contact Charles Korhonen at (603) 646-4438. All other inquiries should be directed to Sharon Borland, Office of Research and Technology Applications, at (603) 646-4735.

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